國立台灣科技大學 114學年 第2學期　課程大綱

Spring 2026 NTUST Course Outline

授課教師：邱俊智

Instructor:Chun-Chih Chiu

課程名稱：最佳化模型及應用

Course Title：Optimization Models and Applications

2026/11/3

課程代號： SI5024701 Course Code 學分數： 3 Credits	必選修：選修/半學年 Required/Electve:Elective/Half Yr. 先修課程： Prerequisites
節次教室： Time/Location	R6(華夏恆毅樓D403) R7(華夏恆毅樓D403) R8(華夏恆毅樓D403)
專業核心能力： Core Professional Competencies	□ 專業知識及技能 □ 解決工程與管理問題之能力 □ 研讀及撰寫專業論文之能力 □ 評估分析與獨立解決問題之能力
課程網址： Course Website	None.
課程宗旨： Course Objectives	This course introduces optimization modeling and solution methods for decision-making in operations, logistics, and smart manufacturing. Students learn how to formulate real-world problems as mathematical programs, understand core algorithmic ideas. Students will be able to: 1. Formulate optimization models (decision variables, objectives, constraints) from real cases. 2. Solve and interpret linear programming (LP) models and sensitivity results. 3. Use duality to explain shadow prices and economic meanings. 4. Model classic assignment/transportation/network problems. 5. Formulate integer programming (IP/MIP) models using binary variables and logical constraints.
課程大綱： Outline of Lectures	Week 1: Course introduction, optimization thinking, and basic model formulation Week 2: Linear programming fundamentals and modeling patterns Week 3: Solving linear programming Week 4: Simplex method concepts and basic feasible solutions Week 5: Simplex method practice with modeling exercises and common pitfalls Week 6: Sensitivity analysis and what-if decision interpretation Week 7: Duality theory and complementary slackness for validation and insight Week 8: Term project proposal writing and topic, data, and preliminary model planning Week 9: Network optimization foundations including shortest path and spanning tree Week 10: Flow models including maximum flow and minimum cut with applications Week 11: Assignment modeling and solution interpretation Week 12: Transportation modeling and logistics applications Week 13: Integer programming fundamentals and binary decision modeling Week 14: Literature presentation Week 15: Term project discussion and model refinement workshop Week 16: Term project final presentation and final report submission
	講授 Lecture：50%

授課方式： Method of Instruction	分組討論 Group discussion：20% 案例研討 Case study：10% 操做練習 Practical exercises：20% 講授 Lecture：%
教科書： Textbooks	1. Operations Research Applications And Algorithms, Wayne L Winston
參考書目： References	1. Introduction to Operation Research 11/e, Frederick S. Hillier and Gerald J. Lieberman
修課須知： Notice	None.
評量方式： Grading	In-class Questions & Assignments (40%) Literature Presentation (25%) Term Project (35%)
備註說明： Notes	Linear Algebra